WHAT IS CLAIMED:

1. An electrothermal fluidized bed furnace comprising:

a furnace body with a first cylindrical portion having a height, a second cylindrical portion disposed above the first cylindrical portion and having a diameter larger than that of the first cylindrical portion, and a conical portion disposed below the first cylindrical portion, the first cylindrical portion and conical portion defining a fluidizing zone, and the second cylindrical portion defining an overbed zone;

at least one electrode disposed within the furnace body and extending through the first and second cylindrical portions;

a treated material discharge pipe at the lower end of the conical portion;

a raw material feed pipe for introducing raw material into the first cylindrical portion;

at least one gas flue at the top of the furnace body for discharging fluidizing gas; and

a plurality of nozzles disposed in the conical section for introducing fluidizing gas into the furnace, the nozzles being arranged in a generally horizontal plane and the nozzles being orientated so that streams of fluidizing gas introduced therethrough cross and form an upward flow in the central portion of the furnace body.

2. The electrothermal fluidized bed furnace of Claim 1 wherein the electrode has a distal end and the distal end is located within the first cylindrical portion of the furnace body.

3. The electrothermal fluidized bed furnace of Claim 1 comprising a single electrode extending centrally through the furnace body.

4. The electrothermal fluidized bed furnace of Claim 1 comprising a plurality of electrodes extending through the furnace body and arranged symmetrically about the central axis thereof.

5. The electrothermal fluidized bed furnace of Claim 1 wherein the conical portion defines a central angle of from 30° to 90°.

6. The electrothermal fluidized bed furnace of Claim 1 wherein the conical portion defines a central angle of from 40° to 60°.

7. The electrothermal fluidized bed furnace of Claim 1 wherein each nozzle is arranged so that the stream of fluidizing gas enters the conical portion at an acute angle with respect to a tangent to the wall of the conical portion.

8. The electrothermal fluidized bed furnace of Claim 1 wherein the nozzles have a central axis and the nozzles are

oriented with respect to the conical portion wall so that the axis of each nozzle and a tangent to the wall of the conical portion at the location of the nozzle defines an angle of from 10° to 20°.

9. The electrothermal fluidized bed furnace of Claim 1 wherein the conical section has a total height H_{TC}, and the nozzles are disposed in the conical section at a distance above the bottom of the conical section of from 0.5 H_{TC} to 0.75 H_{TC}.

10. The electrothermal fluidized bed furnace of Claim 1 wherein the nozzles are disposed in the conical section at a distance above the bottom of the conical section of from 0.6 H_{TC} to 0.6 H_{TC}.

11. The electrothermal fluidized bed furnace of Claim 1 wherein the fluidized bed zone has a height that is less than or equal to twice the height of the first cylindrical portion.

12. The electrothermal fluidized bed furnace of Claim 1 wherein each nozzle has a ring cross-sectional area and the sum of the ring cross-sectional areas of the nozzles is from 0.15% to 0.5% of the cross-sectional area of the first cylindrical portion of the furnace body.

13. The electrothermal fluidized bed furnace of Claim 1 wherein each nozzle has a ring cross-sectional area and the sum of the ring cross-sectional areas of the nozzles is from 0.25%

to 0.4% of the cross-sectional area of the first cylindrical portion of the furnace body.

14. In an electrothermal fluidized bed furnace comprising a furnace body with a first cylindrical portion having a height, a second cylindrical portion disposed above the first cylindrical portion and having a diameter larger than that of the first cylindrical portion, and a conical portion disposed below the first cylindrical portion, the first cylindrical portion and conical portion defining a fluidizing zone, and the second cylindrical portion defining an overbed zone; at least one electrode disposed within the furnace body and extending through the first and second cylindrical portions; a treated material discharge pipe at the lower end of the conical portion; a raw material feed pipe for introducing raw material into the first cylindrical portion; at least one gas flue at the top of the furnace body for discharging fluidizing gas; the improvement comprising:

a plurality of nozzles disposed in the conical section for introducing fluidizing gas into the furnace, the nozzles being arranged in a generally horizontal plane and the nozzles being oriented so that streams of fluidizing gas introduced therethrough cross and form an upward flow in the central portion of the furnace body.

15. The electrothermal fluidized bed furnace of Claim 14 wherein the electrode has a distal end and the distal end is located within the first cylindrical portion of the furnace body.

16. The electrothermal fluidized bed furnace of Claim 14 comprising a single electrode extending centrally through the furnace body.

17. The electrothermal fluidized bed furnace of Claim 14 comprising a plurality of electrodes extending through the furnace body and arranged symmetrically about the central axis thereof.

18. The electrothermal fluidized bed furnace of Claim 14 wherein the conical portion defines a central angle of from 30° to 90°.

19. The electrothermal fluidized bed furnace of Claim 14 wherein the conical portion defines a central angle of from 40° to 60°.

20. The electrothermal fluidized bed furnace of Claim 14 wherein each nozzle is arranged so that the stream of fluidizing gas enters the conical portion at an acute angle with respect to a tangent to the wall of the conical portion.

21. The electrothermal fluidized bed furnace of Claim 14 wherein the nozzles have a central axis and the nozzles are

oriented with respect to the conical portion wall so that the axis of each nozzle and a tangent to the wall of the conical portion at the location of the nozzle defines an angle of from 10° to 20°.

22. The electrothermal fluidized bed furnace of Claim 14 wherein the conical section has a total height H_{TC}, and the nozzles are disposed in the conical section at a distance above the bottom of the conical section of from 0.5 H_{TC} to 0.75 H_{TC}.

23. The electrothermal fluidized bed furnace of Claim 14 wherein the nozzles are disposed in the conical section at a distance above the bottom of the conical section of from 0.6 H_{TC} to 0.6 H_{TC}.

24. The electrothermal fluidized bed furnace of Claim 14 wherein the fluidized bed zone has a height that is less than or equal to twice the height of the first cylindrical portion.

25. The electrothermal fluidized bed furnace of Claim 14 wherein each nozzle has a ring cross-sectional area and the sum of the ring cross-sectional areas of the nozzles is from 0.15% to 0.5% of the cross-sectional area of the first cylindrical portion of the furnace body.

26. The electrothermal fluidized bed furnace of Claim 14 wherein each nozzle has a ring cross-sectional area and the sum of the ring cross-sectional areas of the nozzles is from 0.25%

to 0.4% of the cross-sectional area of the first cylindrical portion of the furnace body.

27. A process for the continuous treatment of particulate matter comprising:

providing an electrothermal fluidized bed furnace in accordance with claim 1;

continuously introducing fluidizing gas through the nozzles of the furnace at a predetermined rate;

continuously introducing untreated particulate material through the feed pipe of the furnace at a predetermined rate so that the particulate matter forms a fluidized bed principally within the first cylindrical portion of the furnace;

energizing the electrode so as to heat the fluidized bed; and

continuously collecting treated particulate matter from the discharge pipe of the furnace.

28. The method of claim 27 wherein the untreated particulate matter has a particle size smaller than 180μm (80 mesh).

29. The method of claim 27 wherein the untreated particulate matter comprises carbonaceous materials.

30. The method of claim 27 wherein the untreated particulate matter comprises graphite selected from the group

comprising flake graphite, synthetic graphite, amorphous graphite, and vein graphite.

31. The method of claim 27 wherein the untreated particulate matter comprises coke selected from the group comprising fluid coke, flexi-bed coke, pitch coke, delayed coke, and needle coke.

32. The method of claim 27 wherein the untreated particulate matter comprises an electroconductive or semiconductive material.

33. A product resulting from the treatment of particulate coke selected from the group comprising fluid coke, flex-bed coke, pitch coke, delayed coke and needle coke in accordance with the method of claim 27.

34. A product resulting from the treatment of particulate graphite selected from the group comprising flake graphite, synthetic graphite, amorphous graphite and vein graphite in accordance with the method of claim 27.